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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/769,107	01/30/2004	Heon Lee	200209240-1	9008

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FORT COLLINS, CO 80527-2400

EXAMINER

DUONG, KHANH B

ART UNIT	PAPER NUMBER
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2822

DATE MAILED: 06/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/769,107

Applicant(s)

LEE ET AL.

Examiner

Khanh B. Duong

Art Unit

2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 March 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) 9-13 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

Applicant's election of Species A (claims 1-8) in the reply filed on March 15, 2006 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claim 9-13 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim.

In addition, claims 14-21 were canceled by Applicant in the response filed October 24, 2005.

Currently, claims 1-8 are active.

Specification

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: METHOD OF FABRICATING A
COMPOSITIONALLY MODULATED ELECTRODE IN A MAGNETIC TUNNEL
JUNCTION DEVICE.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an

international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-3 and 6-8 are rejected under 35 U.S.C. 102(e) as being anticipated by

Horng et al. (U.S. Patent No. 6,993,827).

Re claim 1, Horng et al. ("Horng") discloses in FIG. 2b a method of fabricating a compositionally modulated electrode in a magnetic tunnel junction device, comprising: depositing a mask layer (photoresist used to pattern layer 90) on a surface of a previously fabricated electrode 70 of the magnetic tunnel junction device, the electrode including a first resistivity; patterning a plasma mask in the mask layer; forming the plasma mask in the mask layer so that a portion of the surface is exposed by the plasma mask; forming a high resistivity region 71 that extends inward of the surface by exposing the portion of the surface to a plasma process (argon/oxygen) selected from the group consisting of a plasma oxidation process, the high resistivity region 71 including a second resistivity that is higher than the first resistivity; and removing the plasma mask from the surface of the electrode 70 [see col. 6, lines 34-67].

Re claim 2, Horng expressly discloses in FIG. 2b continuing the forming of the high resistivity region 71 until the high resistivity region 71 extends inward of the surface by a predetermined depth.

Re claim 3, Horng discloses in FIG. 2b the plasma oxidation process comprises a gas plasma including a carrier gas comprising oxygen (argon/oxygen) [see col. 6, lines 37-45].

Re claims 6 and 7, Horng expressly discloses in FIG. 2b the forming the plasma mask (photoresist used to pattern layer 90) comprises a process selected from the group consisting of etching the mask layer and developing the mask layer.

Re claim 8, Horng expressly discloses in FIG. 2b continuing the forming of the high resistivity region 71 until the second resistivity of the high resistivity region 71 reaches a predetermined value of resistivity.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Horng in view of Hiramoto et al. (U.S. Patent No. 6,887,717).

Re claims 4 and 5, Horng discloses the use of plasma oxidation (carrier gas/oxygen) instead of plasma nitridation process (carrier gas/nitrogen) or plasma carburization process (carrier gas/carbon) to form the high resistivity region.

Hiramoto et al. ("Hiramoto") teaches in FIG. 3(c) plasma oxidizing, nitridizing and carbonizing processes are equivalent techniques known in the art for forming a high-resistivity layer 13 [see col. 10, lines 16-30].

Since Horng and Hiramoto are from the same field of endeavor, the purpose disclosed by Hiramoto would have been recognized in the pertinent prior art of Horng.

Therefore, because plasma oxidizing, nitridizing and carbonizing processes were art-recognized equivalents for forming a high-resistivity layer at the time the invention was made, one of ordinary skill in the art would have found it obvious to substitute one technique for the others.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Shimazawa et al. (U.S. 6,657,826) discloses in FIG. 1 forming a high resistivity region 31 in a magnetoresistive device [see col. 14, lines 35-38].

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khanh B. Duong whose telephone number is (571) 272-1836. The examiner can normally be reached on 10:00-6:30.

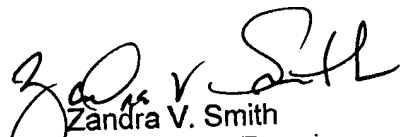
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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith, can be reached on (571) 272-2429. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



KBD



Zandra V. Smith
Supervisory Patent Examiner
30 May 2006